

REMARKS

A. Background

Claims 1-27 were pending in the application at the time of the Office Action. Claims 1-27 were rejected as being anticipated by cited art. By this response applicant has cancelled claims 2, 7-9, 11, 16-18, 20 and 25-27; amended claims 1, 3, 6, 10, 12, 15, 19, 21, and 24; and added new claims 28-36. As such, claims 1, 3-6, 10, 12-15, 19, 21-24, and 28-36 are presented for the Examiner's consideration in light of the following remarks.

B. Proposed Claim Amendments

By this response, Applicant has amended claims 1, 3, 6, 10, 12, 15, 19, 21, and 24 to further clarify, more clearly define, and/or further limit the claimed inventions to expedite receiving a notice of allowance. Most significantly, independent claims 1, 10, and 19 have been amended to include the limitations of dependent claims 2, 11, and 20, respectively. Claims 2, 11, and 20, which have been cancelled herein, previously depended from the aforementioned independent claims. Other clarifications have also been made in these claims. Support for these amendments may be found in the specification as originally filed. Applicant has also added new claims 28-36. New claims 28-36 are also supported in the specification as originally filed. In view of the foregoing, Applicant respectfully submits that the amendments to the claims do not introduce new matter and entry thereof is respectfully requested.

C. Rejection on the Merits

1. Anticipation Rejection under 35 U.S.C. § 102

Paragraphs 3-13 of the Office Action reject claims 1-27 under 35 USC § 102(b) as being

anticipated by U.S. Patent No. 4,967,416 to Esterowitz et al. (“*Esterowitz*”). Of these, claims 1, 7, 10, 16, 19, and 25 are independent claims. Applicant respectfully traverses this rejection.

Applicant respectfully notes that a claim is anticipated under 35 U.S.C. § 102(a), (b), or (e) only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Further, the identical invention must be shown in as complete detail as is contained in the claim. Finally, the elements must be arranged as required by the claim. *MPEP* § 2131.

Regarding independent claims 1, 10, and 19, the Examiner asserts that *Esterowitz* describes “a fiber laser spontaneous emission source and amplifier using an optical fiber doped with a rare-earth element (Thulium) having a laser transition level, where the fiber laser employs a pumping source for exciting thulium from $^3\text{H}_6$ to $^3\text{H}_5$ excitations as pumping source, and the fiber operates in the 2.3 μm band,” and cites Figures 1-2 and Columns 1-3 of *Esterowitz* in support.

Notwithstanding the rejection of independent claims 1, 10, and 19, Applicant notes that the Office Action has not recited all of the elements required in independent claims 1, 10, and 19. For example, the aforementioned independent claims recite that the fiber laser (claim 1), the spontaneous emission source (claim 10), and the optical fiber amplifier (claim 19) each “employs 1.2 μm band light as a pumping source.” In contrast, the Office Action has not even asserted, much less established that *Esterowitz* discloses this limitation in connection with the other limitations of these claims. Furthermore, Applicant is unable to find any reference in the sections of *Esterowitz* cited in the Office Action to using a 1.2 μm band light as an excitation light source.

Applicant notes that by using a 1.2 μm band light as an excitation light source, embodiments of the present invention can provide a remarkable notable advantage unique to the present invention. Embodiments of the present invention can implement a highly reliable, practical fiber laser, spontaneous emission (ASE) source and optical fiber amplifier operating at the 2.3 μm band with no

degradation in the fiber characteristics due to photo darkening because embodiments of the present invention use an optical fiber which is doped with thulium and employs 1.2 μm band light as an excitation light source, and operates at least at 2.3 μm band. The technical significance of this is now discussed.

In identifying problems with current approaches, the specification of the present invention describes that launching high-intensity light with a wavelength equal to or less than 1.05 μm into a Tm-doped fluoride fiber gives rise to a reliability problem: “Furthermore, launching high-intensity light with a wavelength equal to or less than 1.05 μm into a Tm-doped fluoride fiber brings about a phenomenon that causes photo darkening (see, non-patent document 4) that increases the loss of the fluoride fiber itself. FIG. 2 illustrates a loss spectrum (solid curves) before launching 1.047 μm band Nd-YLF laser beam of 500 mW into a Tm-doped fluoride fiber (with an additive density of 2000 wt. ppm, a fiber length of 20 m, and a relative refractive index difference of 3.7%), and a loss spectrum (broken curves) 56 hours after the launch of the laser beam. The loss increase of FIG. 2 is due to defects produced in the glass of the fluoride fiber by launching the laser beam into the fiber. The phenomenon becomes more conspicuous as the incident wavelength becomes short. Accordingly, considering the 2.3 μm band operation laser applications employing the Tm-doped fluoride fibers utilizing the 0.67 μm or 0.8 μm excitation, there arises a problem in the reliability in that the oscillation efficiency decreases with time, and finally the laser oscillation cannot be achieved. Accordingly, using such a conventional light source for the application to a noninvasive blood glucose evaluation equipment or the like cannot make a reliable, practical light source.” Page 5, line 6 to page 6, line 1.

The specification then explains how the present invention solves this problem: “As the excitation wavelength launched into the Tm-doped fiber for eliminating the degradation in the

fiber characteristics due to the photo darkening, 1.2 μm band is used.” Page 6, line 27 to page 7 line 3.

The graph shown in Fig. 9 of the current application clearly illustrates the efficiency that results by using a 1.2 μm band excitation in accordance with the present invention: “FIG. 9 illustrates a loss spectrum (solid curves) before 1.21 μm band semiconductor LD (laser diode) light of about 500 mW is launched into a Tm-doped fluoride fiber (with an additive density of 2000 wt. ppm, a fiber length of 20 m, and a relative refractive index difference of 3.7%); and a loss spectrum (dash-dotted curves) 100 hours after launching that light. As seen from FIG. 9, employing the 1.2 μm band excitation can suppress the photo darkening that increases the loss of the fluoride fiber itself, thereby enabling the highly reliable, practical 2.3 μm band laser application. (In FIG 9, although the spectrum before launching the pumping light differs slightly from the spectrum after launching the 1.21 μm band pumping light, the difference can be considered to be an error arising from the measurement accuracy.)” Page 15, lines 9-23.

In view of the foregoing, because the Office Action has failed to show that each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference, the Office Action has failed to show that the inventions recited in claims 1, 10, and 19 are anticipated by *Esterowitz*. Accordingly, Applicant submits that the anticipation rejection of claims 1, 10, and 19 should be withdrawn.

Claims 3-6, 12-15, and 21-24 variously depend from claims 1, 10, and 19 and thus incorporate the limitations thereof. As such, applicant submits that claims 3-6, 12-15, and 21-24 are distinguished over the cited art for at least the same reasons as discussed above with regard to claims 1, 10, and 19. Accordingly, Applicant respectfully submits that the anticipation rejection of claims 3-6, 12-15, and 21-24 should also be withdrawn.

Claims 2, 7-9, 11, 16-18, 20 and 25-27 have been cancelled herein, thus making the rejection thereof moot.

2. New Claims

New claims 28-36 variously depend from claims 3, 12, and 21 and thus respectively incorporate all of the limitations thereof. As such, Applicant submits that new claims 28-36 are distinguished from the cited art for at least the same reasons that claims 3, 12, and 21 are distinguished from the cited art, as discussed above.

No other objections or rejections are set forth in the Office Action.

D. Conclusion

Applicant notes that this response does not discuss every reason why the claims of the present application are distinguished over the cited art. Most notably, applicant submits that many if not all of the dependent claims are independently distinguishable over the cited art. Applicant has merely submitted those arguments which it considers sufficient to clearly distinguish the claims over the cited art.

In view of the foregoing, applicant respectfully requests the Examiner's reconsideration and allowance of claims 1, 3-6, 10, 12-15, 19, 21-24, and 28-36 as amended and presented herein.

In the event there remains any impediment to allowance of the claims which could be clarified in a telephonic interview, the Examiner is respectfully requested to initiate such an interview with the undersigned.

Dated this 6th day of October 2006.

Respectfully submitted,

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